

WHAT IS CLAIMED:

1. A method of extracting data from a received signal including multi-path interference in a rake receiver, comprising:

sampling and filtering the received signal;

estimating a time delay $\hat{\tau}_l$ between paths for the filtered samples $\psi(\tau)$;

estimating channel complex coefficient \hat{c}_l for the filtered samples $\psi(\tau)$;

extracting transmitted data $x(\tau_l)$ from the filtered samples $\psi(\tau)$ for each path l by solutions of simultaneous equations of the following filtered samples $\psi(\tau)$ equation

$$\psi(\tau) \mathbf{R}_{ff}^{-1}(\tau_k - \hat{\tau}_0) \mathbf{\Lambda}_{ss}^H(\hat{\tau}_k) = \sum_{l=0}^{N_p-1} c_l(\tau_l) x(\tau_l) \mathbf{\Lambda}_{ss}(\tau_l) \mathbf{R}_{ff}(\tau_l - \hat{\tau}_0) \mathbf{R}_{ff}^{-1}(\tau_k - \hat{\tau}_0) \mathbf{\Lambda}_{ss}^H(\hat{\tau}_k) + \bar{\mathbf{n}}(\tau)$$

wherein k is a particular path, N_p the number of visible paths, $\mathbf{R}_{ff}(\tau_l - \hat{\tau}_0)$ is a double convolution matrix of the filtering process and $\mathbf{R}_{ff}^{-1}(\tau_0 - \hat{\tau}_0)$ is the pseudo inverse, $\mathbf{\Lambda}_{ss}(\tau_l)$ is the product of spreading and scrambling matrices and $\mathbf{\Lambda}_{ss}^H(\hat{\tau}_0)$ is the inverse, and $\bar{\mathbf{n}}(\tau)$ is noise.

2. The method according to Claim 1, wherein the method is selectively performed for estimated time delay $\hat{\tau}_l$ of a duration of one chip or less of the receiver.

3. The method according to Claim 1, wherein the filtered samples $\psi(\tau)$ equations without the noises $\bar{\mathbf{n}}(\tau)$ are solved.

4. The method according to Claim 1, wherein the number of solutions is less than or equal to the number of over-samples per chip of the receiver.

5. The method according to Claim 1, wherein the solutions of the simultaneous equations are stored in the receiver and the method is performed in software.

6. The method according to Claim 5, wherein the number of stored solutions is less than or equal to the number of over-samples per chip of the receiver.